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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Kiyoshi Yoshizumi

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EXAMINER

HODGE, ROBERT W

ART UNIT

PAPER NUMBER

1795

NOTIFICATION DATE

DELIVERY MODE

06/04/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/050,866	Applicant(s) YOSHIZUMI ET AL.	
	Examiner ROBERT HODGE	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,8-18,20,32-39,46-49 and 51-67 is/are pending in the application.
- 4a) Of the above claim(s) 2-4,9-13,16-18,20,32-36,46-49,54-57 and 59-62 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,8,14,15,37-39,51-53,58 and 63-67 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of species 3a and 3b in the reply filed on 4/30/09 is acknowledged. The traversal is on the ground(s) that the assertion that the different ways of how the valve is controlled and how the gases are fed to the mixing portion are mutually exclusive is erroneous. This is not found persuasive because the claims alone assert that there is more than one way that the valve can be controlled and more than one way of feeding gases to the mixing portion. The various ways of controlling the valve and feed gases requires different structure to be present and therefore the search would be burdensome to find all of the different structural features required for the various claimed ways of controlling the valve and the feed gases.

The requirement is still deemed proper and is therefore made FINAL.

Claims 13, 54-57 and 59-62 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 4/30/09.

Response to Arguments

Applicant's arguments, see Remarks and claim amendments, filed 12/15/08 and 4/30/09, with respect to the rejection of claim 52 under 35 U.S.C. 112, second paragraph have been fully considered and are persuasive. The rejection of claim 52 under 35 U.S.C. 112, second paragraph has been withdrawn.

Applicant's arguments, see Remarks, filed 12/15/08, with respect to the rejection(s) of claim(s) 1 under 35 U.S.C. 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of U.S. Patent No. 5,059,494.

The remainder of Applicant's arguments filed 12/15/08 have been fully considered but they are not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that the Joerissen and Boneberg references are directed toward different purposes and objectives with respect to each other, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

With regards to claims 8 and 51 which recite hydrogen-off gas can be returned to the fuel cell inlet, the rejection relies on Joerissen for said feature, not Boneberg which is clearly taught in the figure of Joerissen. With regards to claim 52 applicants take Boneberg out of context, in the column 3, lines 32-45 of Boneberg it states that only

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cathode and anode exhaust enters the mixing portion. At column 3, lines 46 et seq. it states that it is possible to **optionally** (emphasis added) supply methanol to the mixing portion such as during start up, no where does it say that methanol has to be supplied or is constantly being supplied as applicants assert. Therefore Boneberg is more than capable of only allowing cathode and anode exhaust gases into the mixing portion.

Applicants' arguments with regards to the newly presented claims that are not withdrawn will be addressed in the grounds of rejection below.

Regarding functional language, applicants are again directed to the response to arguments section in the Non-Final office action dated 7/15/08 which will not be reiterated herein. Furthermore the burden has been shifted to applicants to prove in the form of **evidence** (not arguments) that the prior art is not capable of the functional language recited in the claims, said burden has not been met.

Claim Objections

Claim 51 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 8. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 14, 37-39, 52, 53, 58, 63-65 and 67 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,059,494 hereinafter Vartanian.

As seen in the figures Vartanian teaches a fuel cell system comprising: a fuel cell 1 which is supplied with fuel and air, which generates electric power using the fuel and the air, and which discharges anode exhaust and cathode exhaust that have been consumed; a first flow passage which leads to an anode exhaust port of the fuel cell and through which the discharged anode exhaust flows; a second flow passage which leads to a cathode exhaust port of the fuel cell and through which the discharged cathode exhaust flows; a mixing portion 15 which introduces the discharged anode exhaust and the discharged cathode exhaust from the first and second flow passages respectively and which mixes the cathode exhaust with the anode exhaust; a third flow passage (inherently present) which leads to the mixing portion and through which the mixed gases flow so that the anode exhaust is discharged to the atmosphere: a valve 7, 24 or 26 which is disposed in the first flow passage; a control portion 6A which controls the valve to open and close the valve to allow or block flow of anode exhaust to the mixing portion and thereby controlling flow and concentration of anode exhaust which is mixed with cathode exhaust in the mixing portion; a flow rate-reducing portion 20 including a buffer which is disposed in the first flow passage between the valve and the mixing portion, which reduces the flow rate of the anode exhaust flowing from the valve, and

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which delivers the hydrogen-off gas to the mixing portion, said flow rate-reducing portion has an inlet port and an outlet port, wherein the diameter of the outlet port is smaller than that of the inlet port, said flow-rate reducing portion has a volume per unit length greater than that of the inlet or the outlet port, said flow-rate reducing portion has a variable volume (whole document).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 8, 14, 15, 51-53, 58, 63-65 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 00/63993 hereinafter Joerissen et al. in view of U.S. Patent No. 6,696,188 hereinafter Boneberg et al.

Through the provided translation of WO 00/63993 Joerissen et al. teaches a fuel cell unit 7 that utilizes a metal hydride hydrogen storage device 19 to provide hydrogen to the anode chamber 2 by means of a passage provided with a pressure reduction valve 24. The anode chamber outlet of the fuel cell provides a passage for unreacted hydrogen to be recycled to the anode chamber inlet by means of a pump 9 or exhausted to the atmosphere via a further passage with a valve 7, each of the exhaust passages for discharging anode and cathode off-gas are provided with condensed water separators 8a and 8b, wherein water separator 8a (i.e. flow-rate reducing portion) inherently reduces the flow rate of the exiting anode exhaust and also includes an inherent buffer (i.e. storage of water and an area where the water is separated from the

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gas). Joerissen et al. also teaches a Programmable Logic Controller 14 that controls the valves and pumps of the system based on input received from the entire system such as cell voltage and temperature which then controls all of the fluid flow streams based on said input by either operating pumps and/or valves that are opened and closed at regular intervals and also according to other factors such as concentration which can be determined indirectly from at least cell voltage. Joerissen et al. further teaches a pump 11 (i.e. pressure changing device) in the oxidant inlet stream for the fuel cell to provide oxidant to the fuel cell (see the whole translation of Joerissen, now provided). The Examiner notes that applicants have elected the species of figure 6 and there is only support for a pressure changing device in the seventh flow passage, which is known as the oxidant inlet stream, there is no support in figure 6 for a pressure changing device in the second flow passage, which is known as the oxygen-off gas stream and therefore the limitation of "a flow rate-changing device which is disposed in the second flow passage" has been withdrawn from consideration from claims 11 and 12.

Further clarifying Joerissen for claims 8 and 51, Joerissen teaches in figure 1 that the hydrogen off gas from the fuel cell may circulate back to the fuel cell (i.e. a recycle loop is provided from the hydrogen exhaust passage to the hydrogen inlet passage of the fuel cell).

Joerissen does not teach a mixing portion that mixes the anode and cathode exhaust gases.

Boneberg et al. teaches a fuel cell system being supplied with hydrogen and oxygen gases, which in turn generates electric power (column 3, lines 10-15) then mixing the exhaust gas streams from a fuel cell (figure 1 and column 5, lines 1-3) and combusting the mixture catalytically (column 2, line 15 and column 4, line 2) and then venting the combustion product to the atmosphere thus having a reduced hydrogen content (figure 1 and column 5, line 3).

At the time of the invention it would have been obvious to one having ordinary skill in the art to include a mixing portion at the anode and cathode exhaust ports of Joerissen as taught by Boneberg in order to provide a spent gas mixture that could be catalytically combusted to fully utilize the reactant gases for heating the system as needed and therefore not wasting any reactant gases by venting them to the atmosphere. It is submitted that a skilled artisan would understand how to program the PLC of Joerissen and would therefore understand that by the combination of the Joerissen and Boneberg references above the valve that is controlled by the PLC is capable of controlling the valve to allow or block flow of the hydrogen-off gas to the mixing portion of Joerissen as modified by Boneberg.

Regarding claims 52 and 53 Boneberg teaches that during normal operation of the fuel cell only the exhaust gases from the anode and cathode exhaust streams of the fuel cell are fed to the mixing portion (column 3, lines 32-45).

Claims 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joerissen et al. in view of Boneberg et al. as applied to claim 14 above, and further in view of U.S. Patent No. 2,850,038 hereinafter Shabaker.

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Joerissen et al. as modified by Boneberg et al. does not teach any properties of the flow-rate reducing portion.

Shabaker teaches a flow control device for gaseous material employing variable diameter orifices that can in particular be smaller or larger depending on the control conditions (column 1, lines 15-21 and column 4, lines 3-60).

Joerissen et al. as modified by Boneberg et al. and Shabaker are analogous art because they are from similar problem solving area of controlling the flow of gases.

At the time of the invention it would have been obvious to one having ordinary skill in the art to include different diameter orifices as well as changing the volume of the flow rate reducing device (i.e. water separator) of Joerissen et al. as taught by Shabaker in order to properly remove all of the water from the anode exhaust so that it can be reused for humidification and cooling thereby optimally operating the system, because for example if the flow is too fast not enough water will be removed for reuse in the system and if the flow is too slow the system would get backed up and potentially flood the anode chamber thus rendering the fuel cell useless.

Claims 15 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vartanian in view of U.S. Patent No. 6,455,181 hereinafter Hallum.

Vartanian as discussed above is incorporated herein.

Vartanian does not teach the use of a hydrogen concentration sensor in the anode exhaust line.

Hallum teaches a fuel cell system with a sensor 80 that detects the concentration of hydrogen in the anode outlet lines (column 5, line 18 - column 7, line 57).

At the time of the invention it would have been obvious to one having ordinary skill in the art to provide a hydrogen concentration sensor in the anode exhaust line of Vartanian as taught by Hallum in order to provide a fuel cell system that can regulate the anode gases based on the hydrogen concentration measured by the sensor thereby improving the overall operation of the fuel cell. If a technique has been used to improve one device (providing a hydrogen concentration sensor in the anode exhaust line), and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way (providing a fuel cell system that can regulate the anode gases based on the hydrogen concentration measured by the sensor thereby improving the overall operation of the fuel cell), using the technique is obvious unless its actual application is beyond his or her skill. See MPEP 2141 (III) Rationale C, KSR v. Teleflex (Supreme Court 2007). It is submitted that a skilled artisan would understand how to program the controller of Vartanian and would therefore understand that by the combination of the Vartanian and Hallum references above the valve that is controlled by the controller is capable of controlling the valve to allow or block flow of the anode exhaust to the mixing portion based on the hydrogen concentration.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT HODGE whose telephone number is (571)272-2097. The examiner can normally be reached on 8:00am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Robert Hodge/
Examiner, Art Unit 1795